

Permanent GPS Station LAE1

Paul Tregoning and Richard Stanaway
Australian National University
(pault@rse.anu.edu.au)

Job Suat and Suvenia Hasiata
Papua New Guinea University of Technology, Lae
(shasiata@survey.unitech.ac.pg)

The GPS site LAE1 in Lae, Papua New Guinea is the first IGS station in this country and fills a geographical void in the global tracking network in the western Pacific region. The successful installation and operation of the site is a result of cooperation several universities:

- The Department of Surveying and Land Studies at The Papua New Guinea University of Technology, upon whose building the antenna is mounted. Staff installed the site and are responsible for maintaining the continued operation of the GPS equipment and the internet data link.
- The Research School of Earth Sciences at The Australian National University who provide the Ashtech chokering antenna, cabling, base station software and ongoing support;
- The University of California, Santa Cruz, who provide the Ashtech Z-XII GPS receiver.

The site was first observed in 1996 in support of a national geodetic crustal motion survey. Continuous operation began at LAE1 in July 1997 (day of year 209) and has essentially continued uninterrupted to the present day. An automated, internet-connected download procedure was installed in November 2000 that allowed the data to be transferred directly from Lae to The Australian National University. The site was officially listed as an IGS site in April 2001 and both daily and hourly rinex files for this site have been provided to the IGS since this time.

LAE1 is located on the hanging wall of the Ramu-Markham Fault, the boundary between the Australian and South Bismarck Plates. These two plates are undergoing arc-continental collision at a rate of ~40 mm/yr along this part of the fault. The motion of the site has remained essentially linear since 1997, although the estimated site velocity differs from the predicted velocity of both the Australian and South Bismarck Plates. Thus, the site is located in a deforming zone. Further information about the GPS site can be found at <http://rse.anu.edu.au/external/unitech/lae1inst.htm>.

The tide gauge in Lae harbour is 9 km from the GPS installation. A precise levelling survey was conducted in May 2002 to connect the GPS site to the tide. The height of the GPS monument reference point above the tide gauge zero was found to 58.748 ± 0.005 m. Unfortunately the tide gauge has not been operating since 1999.



Figure 1. LAE1 antenna installation.

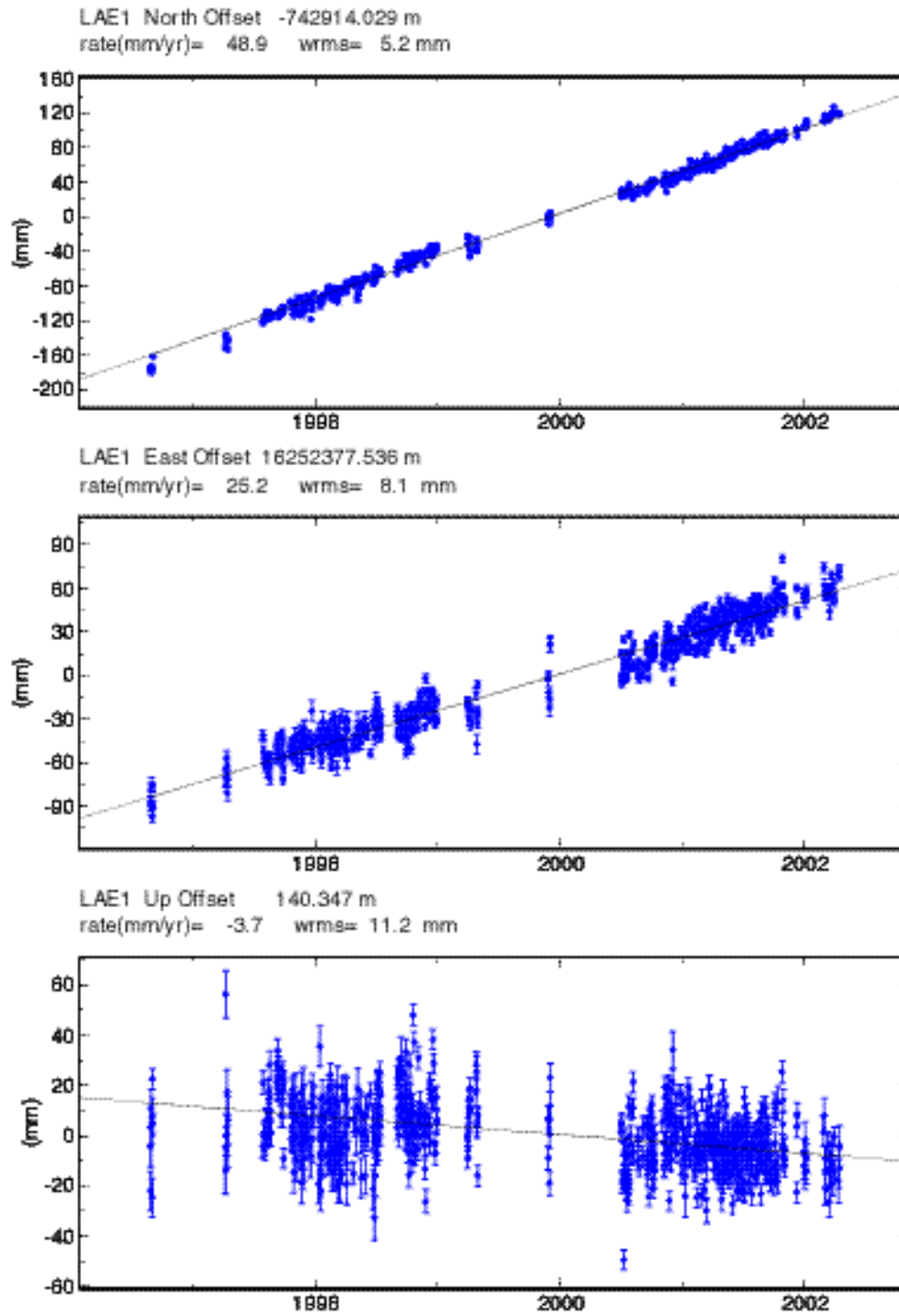


Figure 2. Time series of daily coordinate estimates. The data were processed at RSES using the GAMIT/GLOBK software.